## NAME

**INSTALL** – Installation procedure for NetBSD/hp300.

## CONTENTS



## DESCRIPTION

### About this Document

This document describes the installation procedure for NetBSD 1.5.3 on the *hp300* platform. It is available in four different formats titled `INSTALL.`*ext*, where *.ext* is one of `.ps`, `.html`, `.more`, or `.txt`:

`.ps` PostScript.

`.html` Standard Internet HTML.

`.more` The enhanced text format used on UNIX-like systems by the `more`(1) and `less`(1) pager utility programs. This is the format in which the on-line *man* pages are generally presented.

`.txt` Plain old ASCII.

You are reading the *PostScript* version.

## What is NetBSD?

The NetBSD Operating System is a fully functional Open Source UNIX-like operating system derived from the University of California, Berkeley Networking Release 2 (Net/2), 4.4BSD-Lite, and 4.4BSD-Lite2 sources. NetBSD runs on thirty-one different system architectures featuring twelve distinct families of CPUs, and is being ported to more. The NetBSD 1.5.3 release contains complete binary releases for fifteen different machine types. (The sixteen remaining are not fully supported at this time and are thus not part of the binary distribution. For information on them, please see the NetBSD web site at **http://www.netbsd.org/**.)

NetBSD is a completely integrated system. In addition to its highly portable, high performance kernel, NetBSD features a complete set of user utilities, compilers for several languages, the X Window System, firewall software and numerous other tools, all accompanied by full source code.

NetBSD is a creation of the members of the Internet community. Without the unique cooperation and coordination the net makes possible, it's likely that NetBSD wouldn't exist.

## Upgrade path to NetBSD 1.5.3

If you are not installing your system "from scratch" but instead are going to upgrade an existing system already running NetBSD you need to know which versions you can upgrade with NetBSD 1.5.3.

NetBSD 1.5.3 is an upgrade of NetBSD 1.5, 1.5.1, 1.5.2, and earlier major and maintenance releases of NetBSD.

The intermediate development versions of code available on the main trunk in our CVS repository (also known as "NetBSD-current") from *after* the point where the release cycle for 1.5 was started are designated by version identifiers such as 1.5A, 1.5B, etc. These identifiers do not designate releases, but indicate major changes in internal kernel APIs. Note that the kernel from NetBSD 1.5.3 can *not* be used to upgrade a system running one of those intermediate development versions. Trying to use the NetBSD 1.5.3 kernel on such a system *will* probably result in problems.

Please also note that it is not possible to do a direct "version" comparison between any of the intermediate development versions mentioned above and 1.5.3 to determine if a given feature is present or absent in 1.5.3. The development of 1.5 and the subsequent maintenance releases is done on a separate branch in the CVS repository. The branch was created when the release cycle for 1.5 was started, and during the release cycle of 1.5 and its maintenance releases, selected fixes and enhancements have been imported from the main development trunk. So, there are features in 1.5.3 which were not in, e.g. 1.5B, and vice versa.

## Major Changes Between 1.5.2 and 1.5.3

Some highlights are:

- `lpd`(8) has been fixed to deal with a security issue (SA2001-018).
- Drivers for Mylex DAC960, Compaq EISA array controllers, and I2O block/SCSI devices added. This has caused `ca`(4) to be replaced by `ld`(4). Drivers for the Mylex DAC960 management interface and DPT/Adaptec I2O RAID management interface has also been added. See `dpti`(4) and `mlxctl`(8).

- A driver for the 3ware Escalade 5000 and 6000 series RAID controllers has been added, see twe(4).
- Various different fixes have been applied to the network device drivers ep(4), ex(4), rtk(4), sip(4), ti(4), tl(4), and wi(4).
- Support for some more variants of rtk(4) on CardBus has been added.
- The ne(4) driver has been extended to support some more pcmcia cards.
- Support for more pciide(4) controllers added: HPT-370A, Acard ATP-850/860, and AMD-768. Ultra-DMA 100 support added for CMD 0649.
- A problem with the NFS server code, exposed on NetBSD/alpha, where use of ‘‘..’’ would return info for ‘‘.’’ has been fixed.
- Support for ‘‘other-endian’’ file systems has been improved.
- The layout algorithm for FFS file systems has been substantially improved, resulting in better performance, both due to improved locality between files and their corresponding directory, and lessened pressure on the buffer cache.
- The performance of soft dependencies in FFS has been significantly improved in some circumstances.
- Handling of init/fini section support and DWARF2 exception handling has been added to the C runtime startup code.
- OpenSSH has been upgraded to version 3.0.2.
- A security issue arising from a race between set-uid execution and use of ptrace has been fixed (SA2002-001).
- The package tools has been extended to provide for optional digital signatures on binary packages. Additionally, binary package version number handling has been rewritten.
- A driver for Creative Labs SBLive! EMU10000 has been added; see emuxki(4).
- A driver for ESS Allegro-1 / Maestro-3 has been added; see esa(4).
- Support for the 53c1010-33 and 53c1510D has been added to the siop(4) driver.
- IPFilter upgraded to 3.4.23.
- The boot code on NetBSD/macppc has been improved.
- sendmail(8) has been upgraded to version 8.11.6.
- A long file name buffer overrun in gzip has been fixed (SA2002-002).
- IPSEC policy check has been fixed for forwarded IPv4 packets (SA2002-003).
- Two security problems in OpenSSH has been fixed (SA2002-004, SA2002-005).
- A buffer overrun in the resolver part of the C library has been fixed (SA2002-006). To fix this problem in the BIND user utilities, BIND has been upgraded to version 8.3.3.
- Various other kernel stability and robustness fixes has been applied.

In addition, many bugs have been fixed—more than 70 problems reported through our problem tracking system have been fixed, and several other non-reported problems have also been found and fixed. See the CHANGES-1.5.3 file for the complete list.

**Known Caveats with 1.5.3**

The following are the major known issues with NetBSD 1.5.3.

- The upgrade of IPFilter to version 3.4.23 is not backward compatible. This means that the user-land tools used to manage IPFilter will have to be upgraded when the kernel is upgraded.
- Due to xsrc changes which are not backward compatible on the arm32 port, the X bits for arm32 is built from the 1.5.2 sources.

**Major Changes Between 1.5.1 and 1.5.2**

The main purpose of NetBSD 1.5.2 is to fix some problems discovered shortly after the release of NetBSD 1.5.1. Some highlights are:

- `telnetd`(8) has been fixed to deal with a security issue (SA2001-012).
- A weakness in the OpenSSL libcrypto's pseudo random number generator has been fixed (SA2001-013).
- Floating point emulation on i386 (to run on FPU-less CPUs) which was broken late in 1.5.1's cycle has been restored to working order.
- Bugs in the compiler have been worked around to produce a working miniroot image on sparc64.
- The script-based installers on amiga, atari and mvme68k have been updated to deal with new behaviour from `mount`(8).
- `dump`(8) has been fixed to deal with a local security issue (SA2001-014).
- Several system calls have had defensive length checks applied on their arguments (SA2001-015).
- The DHCP software has been upgraded to ISC Version 3, Release Candidate 10.

Additionally, a few more bugs have been fixed. See the CHANGES-1.5.2 file for the complete list of changes.

**Major Changes Between 1.5 and 1.5.1**

The complete list of changes between NetBSD 1.5 and 1.5.1 can be found in the file CHANGES-1.5.1 in the top directory of the source tree. The following are highlights only:

- A driver for the Aironet/Cisco wireless PCMCIA cards has been added; see `an`(4).
- NFS client performance has been improved, typically by 40% for writes but possibly up to 100% in certain setups.
- The `siop`(4) driver has improved in performance and robustness.
- Support for cloning pseudo-interfaces has been added. See `ifconfig`(8).
- Support for 802.1Q virtual LANs has been added. See `vlan`(4).
- The `isp`(4) driver has been upgraded to (among other things) work on MacPPC.
- BIND has been upgraded to version 8.2.3 (SA2001-001).
- Support for booting from RAIDframe RAID1 mirrors on i386 added.
- The `lfs`(4) file system has again been substantially updated, but is still experimental.
- Ultra/66 support has been added for capable VIA chipsets, and Ultra/100 support has been added for the HPT370, Promise and Intel ICH2 controllers in the `pciide`(4) driver. Support for Intel 82801BAM controllers has also been added, and handling of Ali controllers has been improved.

- OpenSSH has been updated to deal with a security issue (SA2001-003).
- Sendmail has been upgraded to version 8.11.3.
- The ex(4) driver has added support for 3Com 3c555, 3c556 and 3c556B MiniPCI Ethernet cards.
- A driver for the on-board audio hardware found on many Apple PowerMacs has been added; see awacs(4).
- The sip(4) driver has been fixed to properly support the dp83815, as found in current Netgear FA311 10/100 cards.
- ftpd(8) has been updated to deal with two security issues (SA2000-018 and SA2001-005).
- ntpd(8) has been updated to deal with a security issue (SA2001-004).
- telnetd(8) has been updated to deal with a security issue (SA2000-017).
- A vulnerability on i386 related to USER_LDT has been fixed (SA2001-002).
- The Linux emulation has been enhanced to prepare for the support of using the Linux version of VMware.
- IP checksumming speed has been improved on i386 compared to NetBSD 1.5 by about 10%.
- Support for the Socket Communications LP-E Type II PCMCIA NE2000 clone card has been added to ne(4).
- The DHCP software has been upgraded to ISC version 3, Beta 2, patchlevel 24, to fix core dumps in dhclient(8), among other things. Please note that the new dhcpd(8) forces you to configure a "ddns-update-style" of either "ad-hoc", "interim" or "none".
- Various fixes and enhancements to INET6 and IPSEC code; among them improved interaction between IPF/Nat and IPSEC.
- The Heimdal kerberos(8) implementation has been upgraded to version 0.3e.
- Support for Accton EN2242 and other AmdTek AN985 cards added to the tlp(4) driver.
- Several country-specific keyboard mappings have been added for USB keyboards.
- A driver for Yamaha YMF724/740/744/745-based sound cards has been added, see yds(4).
- The maximum number of BSD disklabel partitions on the i386 port has been increased from 8 to 16.
- Drivers for the AC'97 based audio sound chips ESS Technology Maestro 1, 2, and 2E (see esm(4)), NeoMagic 256 (see neo(4)), and Cirrus Logic CrystalClear PCI Audio CS4281 (see clct(4)) have been added.

In addition, many bugs have been fixed—more than 95 problems reported through our problem tracking system have been fixed, and some other non-reported problems have also been found and fixed. See the CHANGES-1.5.1 file for the complete list.

The NetBSD Packages Collection (pkgsrc) which is used to maintain, build, track dependencies, and maintain NetBSD-specific fixes to third-party programs, has received a major overhaul for NetBSD 1.5.1. Some highlights are:

- Many new packages were added to the collection, which now includes about 2100 packages. Many of them are also available as pre-compiled binaries on ftp.netbsd.org and its mirrors. Many packages have been modified and enhanced to compile and function properly on big-endian (m68k, sparc), and LP64 architectures (alpha, sparc64).

- KDE2 and KOffice together consitutes a fully integrated office environment with no license problems, available for i386, alpha and many other architectures.
- Mozilla 0.9, KDE2's Konqueror, and Links 0.95 are just a few examples of the web browsers available.
- A support package for running VMware on NetBSD/i386 was added, it's called suse_vmware. The official VMware code, a valid license, and Wasabi Systems' compatibility package are all needed to run VMware.
- Internal changes of the pkgsrc system include strong checksums to prevent malicious distribution files, as well as restructuring of the package structure in pkgsrc for faster extraction of pkgsrc tar files and upgrades via SUP and CVS.

Please note that at the moment, **sysinst** will not assist you in installing pre-built third-party binary packages or the pkgsrc system itself, so you will have to manually install packages using **pkg_install** or fetch and extract the pkgsrc.tgz tar file to get started.

Lastly, it should be noted that the X11 binaries shipped in NetBSD 1.5.3 is still based on XFree86 version 3.3.6. Several newer graphics cards are inadequately supported by that code base, but on the other hand support for several older graphics cards is not available in newer XFree86 code. NetBSD is in the process of moving to XFree86 version 4, and is currently maintaining both the XFree86 3.3.6 and the XFree86 version 4 code in the **xsrc** source set, and you may at compile time pick which sources to build and install. To ease installation, testing and use of the XFree86 version 4 code, a binary snapshot based on XFree86 version 4.0.3 will be made available for at least the i386 architecture shortly after the release of NetBSD 1.5.3.

## Changes Between The NetBSD 1.4 and 1.5 Releases

The NetBSD 1.5 release provides numerous significant functional enhancements, including support for many new devices, integration of hundreds of bug fixes, new and updated kernel subsystems, and many userland enhancements. The result of these improvements is a stable operating system fit for production use that rivals most commercially available systems.

It is impossible to completely summarize over one year of development that went into the NetBSD 1.5.3 release. Some highlights include:

*Kernel*

- Ports to new platforms including: arc, cobalt, hpcmips, news68k, sgimips, and sparc64.
- Improved performance and stability of the UVM virtual memory subsystem.
- Implementation of generic kernel locking code, as well as a restructure and re-tuning of the scheduler, to be used by the future symmetric multi-processing (SMP) implementation.
- Improved compatibility support for Linux, OSF1, and SVR4 programs.
- New compatibility support for Win32 programs.
- Support for dynamically loaded ELF kernel modules.
- Kernel process tracing using `ktruss`(1).
- Deletion of swap devices using `swapctl`(8).
- Easier hot-pluggability of keyboards and mice using a new wscons device—wsmux.
- Improved PCMCIA and CardBus support, including support for detaching of devices and cards, resulting in better support for notebooks and PDA devices.

- Numerous hardware improvements, including areas such as: audio, UDMA/66 support for ATA drives, USB, and wireless networking.

*Networking*

- Addition of IP version 6 (IPv6) and IPsec to the networking stack, from the KAME project. This includes addition of kernel code for IPv6/IPsec, IPv4/v6 dual-stack user applications and supporting libraries. Due to this, the shlib major version for `pcap`(3) is incremented and you may need to recompile userland tools. The KAME IPv6 part includes results from the unified-IPv6 effort.

*File system*

- Significant Fast file system (FFS) performance enhancements via integration of Kirk McKusick's soft updates and trickle sync code.
- Support for the Windows NT 'NTFS' file system (read-only at this stage).
- Support for revision 1 of the Linux 'ext2fs' file system.
- Enhanced stability and usability of LFS (the BSD log-structured file system).
- Various RAIDframe enhancements including: auto-detection of RAID components and auto-configuration of RAID sets, and the ability to configure the root file system ( / ) on a RAID set.
- Support for Microsoft Joliet extensions to the ISO9660 CD file system.
- Improved file system vnode locking mechanisms, thus resolving a source of several panics in the past.
- Support for NFS and RPC over IPv6.
- The server part of NFS locking (implemented by `rpc.lockd`(8)) now works.

*Security*

- Strong cryptographic libraries and applications integrated, including the AES cipher Rijndael, the OpenSSL library, more complete Kerberos IV and Kerberos V support, and an SSH server and client.
- `sysctl`(3) interfaces to various elements of process and system information, allowing programs such as `ps`(1), `dmesg`(1) and the like to operate without recompilation after kernel upgrades, and remove the necessity to run setgid kmem (thus improving system security).
- Disable various services by default, and set the default options for disabled daemons to a higher level of logging.
- Several code audits were performed. One audit replaced string routines that were used without bounds checking, and another one identified and disabled places where format strings were used in unsafe ways, allowing arbitrary data to be entered by (possibly) malicious users to overwrite application code, and leading from Denial of Service attacks to compromised systems.
- `sshd`(8) and `ssh`(1) now require `rnd`(4) kernel random number devices.

*System administration and user tools*

- Conversion of the `rc`(8) system startup and shutdown scripts to an 'rc.d' mechanism, with separate control scripts for each service, and appropriate dependency ordering provided by `rcorder`(8).
- `postfix`(1) provided as alternative mail transport agent to `sendmail`(8).
- User management tools `useradd`(8), `usermod`(8), `userdel`(8), `groupadd`(8), `groupmod`(8), and `groupdel`(8) added to the system.

- Incorporation of a login class capability database ( `/etc/login.conf` ) from BSD/OS.
- Improved support for usernames longer than eight characters in programs such as `at`(1) and `w`(1).
- Many enhancements to `ftpd`(8) providing features found in larger and less secure FTP daemons, such as user classes, connection limits, improved support for virtual hosting, transfer statistics, transfer rate throttling, and support for various IETF ftpext working group extensions.
- The `ftp`(1) client has been improved even further, including transfer rate throttling, improved URL support, command line uploads. See the man page for details.

*Miscellaneous*

- Updates to the NetBSD source code style code (located in `/usr/share/misc/style`) to use ANSI C only (instead of K&R) and reflect current (best) practice, and begin migrating the NetBSD source code to follow it.
- Implementation of many SUSv2 features to the `curses`(3) library, including support for color.
- Updates of most third party packages that are shipped in the base system, including `file`(1), `ipfilter`(4), `ppp`(4), and `sendmail`(8) to the latest stable release.
- Many new packages in the *pkgsrc* system, including standard desktops like KDE and GNOME as well as latest Tcl/Tk and perl and many of the components of the Java Enterprise platform. The package framework itself now has full wildcard dependency support.

Kernel interfaces have continued to be refined, and more subsystems and device drivers are shared among the different ports. You can look for this trend to continue.

This is the sixth major release of NetBSD for the HP 9000/300 series of computers.

## The Future of NetBSD

The NetBSD Foundation has been incorporated as a non-profit organization. Its purpose is to encourage, foster and promote the free exchange of computer software, namely the NetBSD Operating System. The foundation will allow for many things to be handled more smoothly than could be done with our previous informal organization. In particular, it provides the framework to deal with other parties that wish to become involved in the NetBSD Project.

The NetBSD Foundation will help improve the quality of NetBSD by:

- providing better organization to keep track of development efforts, including co-ordination with groups working in related fields.
- providing a framework to receive donations of goods and services and to own the resources necessary to run the NetBSD Project.
- providing a better position from which to undertake promotional activities.
- periodically organizing workshops for developers and other interested people to discuss ongoing work.

We intend to begin narrowing the time delay between releases. Our ambition is to provide a full release every six to eight months.

We hope to support even *more* hardware in the future, and we have a rather large number of other ideas about what can be done to improve NetBSD.

We intend to continue our current practice of making the NetBSD-current development source available on a daily basis.

We intend to integrate free, positive changes from whatever sources submit them, providing that they are well thought-out and increase the usability of the system.

Above all, we hope to create a stable and accessible system, and to be responsive to the needs and desires of NetBSD users, because it is for and because of them that NetBSD exists.

## Sources of NetBSD

Refer to **http://www.netbsd.org/Sites/net.html**.

## NetBSD 1.5.3 Release Contents

The root directory of the NetBSD 1.5.3 release is organized as follows:

`.../NetBSD-1.5.3/`

| | |
|---|---|
| `CHANGES` | Changes since earlier NetBSD releases. |
| `LAST_MINUTE` | Last minute changes. |
| `MIRRORS` | A list of sites that mirror the NetBSD 1.5.3 distribution. |
| `README.files` | README describing the distribution's contents. |
| `TODO` | NetBSD 's todo list (also somewhat incomplete and out of date). |
| `patches/` | Post-release source code patches. |
| `source/` | Source distribution sets; see below. |

In addition to the files and directories listed above, there is one directory per architecture, for each of the architectures for which NetBSD 1.5.3 has a binary distribution. There are also `README.export-control` files sprinkled liberally throughout the distribution tree, which point out that there are some portions of the distribution that may be subject to export regulations of the United States, e.g. code under `src/crypto` and `src/sys/crypto`. It is your responsibility to determine whether or not it is legal for you to export these portions and to act accordingly.

The source distribution sets can be found in subdirectories of the `source` subdirectory of the distribution tree. They contain the complete sources to the system. The source distribution sets are as follows:

**gnusrc** This set contains the "gnu" sources, including the source for the compiler, assembler, groff, and the other GNU utilities in the binary distribution sets.
*22.3 MB gzipped, 98.8 MB uncompressed*

**pkgsrc** This set contains the "pkgsrc" sources, which contain the infrastructure to build third-party packages.
*7.4 MB gzipped, 73.0 MB uncompressed*

**sharesrc** This set contains the "share" sources, which include the sources for the man pages not associated with any particular program; the sources for the typesettable document set; the dictionaries; and more.
*3.3 MB gzipped, 13.2 MB uncompressed*

**src** This set contains all of the base NetBSD 1.5.3 sources which are not in **gnusrc**, **sharesrc**, or **syssrc**.
*24.8 MB gzipped, 123.1 MB uncompressed*

**syssrc** This set contains the sources to the NetBSD 1.5.3 kernel for all architectures; `config`(8); and `dbsym`(8).
*18.0 MB gzipped, 90.9 MB uncompressed*

**xsrc** This set contains the sources to the X Window System.
*78.1 MB gzipped, 393.6 MB uncompressed*

All the above source sets are located in the `source/sets` subdirectory of the distribution tree.

The source sets are distributed as compressed tar files. They may be unpacked into `/usr/src` with the command:

```
# ( cd / ; tar -zxpf - ) < set_name.tgz
```

The `sets/Split/` subdirectory contains split versions of the source sets for those users who need to load the source sets from floppy or otherwise need a split distribution. The split sets are named `set_name.`*xx* where `set_name` is the distribution set name, and *xx* is the sequence number of the file, starting with "aa" for the first file in the distribution set, then "ab" for the next, and so on. All of these files except the last one of each set should be exactly 240,640 bytes long. (The last file is just long enough to contain the remainder of the data for that distribution set.)

The split distributions may be reassembled and extracted with **cat** as follows:

```
# cat set_name.?? | ( cd / ; tar -zxpf - )
```

In each of the source distribution set directories, there are files which contain the checksums of the files in the directory:

- `BSDSUM` Historic BSD checksums for the various files in that directory, in the format produced by the command: **cksum -o 1** *file*.
- `CKSUM` POSIX checksums for the various files in that directory, in the format produced by the command: **cksum** *file*.
- `MD5` MD5 digests for the various files in that directory, in the format produced by the command: **cksum -m** *file*.
- `SYSVSUM` Historic AT&T System V UNIX checksums for the various files in that directory, in the format produced by the command: **cksum -o -2** *file*.

The MD5 digest is the safest checksum, followed by the POSIX checksum. The other two checksums are provided only to ensure that the widest possible range of system can check the integrity of the release files.

*NetBSD/hp300 subdirectory structure*

The hp300-specific portion of the NetBSD 1.5.3 release is found in the `hp300` subdirectory of the distribution: `.../NetBSD-1.5.3/hp300/`

`INSTALL.html`
`INSTALL.ps`
`INSTALL.txt`
`INSTALL.more` Installation notes in various file formats, including this file. The `.more` file contains underlined text using the `more`(1) conventions for indicating italic and bold display.

`binary/`
- `kernel/`
  - `netbsd.GENERIC.gz` A gzipped NetBSD kernel containing code for everything supported in this release.
- `sets/` hp300 binary distribution sets; see below.

`installation/`
- `floppy/` hp300 boot and installation floppies; see below.

`miniroot/` hp300 miniroot file system image; see below.
`misc/` Miscellaneous hp300 installation utilities; see installation section, below.

*Binary distribution sets*

The NetBSD hp300 binary distribution sets contain the binaries which comprise the NetBSD 1.5.3 release for the hp300. There are eight binary distribution sets. The binary distribution sets can be found in the `hp300/binary/sets` subdirectory of the NetBSD 1.5.3 distribution tree, and are as follows:

**base** The NetBSD 1.5.3 hp300 **base** binary distribution. You *must* install this distribution set. It contains the base NetBSD utilities that are necessary for the system to run and be minimally functional. It includes shared library support, and excludes everything described below.
*15.7 MB gzipped, 41.5 MB uncompressed*

**comp** Things needed for compiling programs. This set includes the system include files ( `/usr/include` ) and the various system libraries (except the shared libraries, which are included as part of the **base** set). This set also includes the manual pages for all of the utilities it contains, as well as the system call and library manual pages.
*11.8 MB gzipped, 39.5 MB uncompressed*

**etc** This distribution set contains the system configuration files that reside in `/etc` and in several other places. This set *must* be installed if you are installing the system from scratch, but should *not* be used if you are upgrading.
*0.1 MB gzipped, 0.6 MB uncompressed*

**games** This set includes the games and their manual pages.
*3.0 MB gzipped, 7.4 MB uncompressed*

**kern** This set contains a NetBSD/hp300 1.5.3 `GENERIC` kernel, named `/netbsd`. You *must* install this distribution set.
*0.7 MB gzipped, 1.6 MB uncompressed*

**man** This set includes all of the manual pages for the binaries and other software contained in the **base** set. Note that it does not include any of the manual pages that are included in the other sets.
*5.6 MB gzipped, 22.7 MB uncompressed*

**misc** This set includes the (rather large) system dictionaries, the typesettable document set, and other files from `/usr/share`.
*2.2 MB gzipped, 7.5 MB uncompressed*

**text** This set includes NetBSD's text processing tools, including `groff`(1), all related programs, and their manual pages.
*1.3 MB gzipped, 4.7 MB uncompressed*

NetBSD maintains its own set of sources for the X Window System in order to assure tight integration and compatibility. These sources are based on XFree86, and tightly track XFree86 releases. The binaries shipped with NetBSD 1.5.3 are based on XFree86 version 3.3.6. NetBSD is in the process of moving to XFree86 version 4, and the X source set actually contains source for both XFree86 3.3.6 and XFree86 4, and the ability to decide at compile-time which one to build and install. The X Window System binary sets distributed with NetBSD are:

**xbase** The basic files needed for a complete X client environment. This does not include the X servers.
*2.6 MB gzipped, 8.2 MB uncompressed*

**xcomp** The extra libraries and include files needed to compile X source code.
*1.7 MB gzipped, 7.2 MB uncompressed*

**xcontrib** Programs that were contributed to X.
*0.2 MB gzipped, 0.7 MB uncompressed*

**xfont** Fonts needed by X.
*6.2 MB gzipped, 7.5 MB uncompressed*

The hp300 binary distribution sets are distributed as gzipped tar files named with the extension **.tgz**, e.g. `base.tgz`.

The instructions given for extracting the source sets work equally well for the binary sets, but it is worth noting that if you use that method, the files are `/`-relative and therefore are extracted *below* the current directory. That is, if you want to extract the binaries into your system, i.e. replace the system binaries with them, you have to run the **`tar -xpf`** command from `/`.

The following are included in the `hp300/installation` directory:

`miniroot/`

`miniroot.fs.gz` A copy of the miniroot file system.

`misc/`

`HP-IB.geometry` A file containing geometry for some HB-IB disk drives.

`SYS_INST.gz` A gzipped copy of the SYS_INST miniroot installation program.

`SYS_UBOOT.gz` A gzipped copy of the universal boot block. Supports Network, tape and disk booting. This is useful if you are installing a diskless NetBSD/hp300 system.

`rbootd.tgz` Source code for the rbootd program included with NetBSD. It requires that the server has a Berkeley Packet Filter (bpf). You will need to compile this version of rbootd if server system does not have this utility already.

The following are included in the `hp300/binary/kernel` directory:

`netbsd.gdb.gz` A gzipped `GENERIC` kernel with debugging symbols.

`netbsd.gz` A gzipped `GENERIC` kernel.

*Note:* Each directory in the hp300 binary distribution also has its own checksum files, just as the source distribution does.

### NetBSD/hp300 System Requirements and Supported Devices

NetBSD/hp300 1.5.3 will run on most HP 9000/300- and 400-series machines. The smallest amount of RAM that has been tested is 4 MB. If you wish to run X, more RAM is recommended.

Here is a table of recommended HD partition sizes for a full install:

| Partition | Suggested | Needed |
|---|---|---|
| / (root) | 25 MB | 15 MB |
| /usr | 150 MB | 100 MB |
| /var | 20 MB | 5 MB |
| swap | *2-3 *RAM* | 6 MB |

Anything else is up to you!

*Note:* The hp300 installation procedure uses a *miniroot* file system which is placed into the swap area of the disk. The swap partition must be large enough to hold this miniroot image.

*Supported hardware*

- CPUs
  - 68020-based: 318, 319, 320, 330, and 350.
  - 68030-based: 340, 345, 360, 370, 375, and 400 [1].
  - 68040-based: 380, 425 [1], and 433 [1].
- Disks
  - HP-IB/CS80: 7912, 7914, 7933, 7936, 7937, 7945, 7957, 7958, 7959, 2200, and 2203.
  - SCSI-I [2], including magneto-optical and CD-ROM.
- Tape drives
  - Low-density HP-IB/CS80 cartridge: 7914, 7946, and 9144.
  - High-density HP-IB/CS80 cartridge: 9145.
  - HP-IB/CS80 1/2": 7974A, 7978A/B, 7979A, 7980A, and 7980XC.
  - SCSI: HP DAT, Exabyte, and SCSI QIC drives such as the Archive Viper.
- RS232 interfaces
  - 98644 built-in single port (dca).
  - 98642 4-port (dcm).
  - 98638 8-port (dcm).
- Network interfaces
  - 98643 built-in and add-on LAN cards.
- Displays
  - 98544, 98545, and 98547 color and monochrome Topcat.
  - 98548, 98549, and 98550 color and monochrome Catseye.
  - 98700 and 98710 Gatorbox.
  - 98720 and 98721 Renaissance.
  - 98730 and 98731 DaVinci.
  - A1096A monochrome Hyperion.
- Input devices
  - General interface supporting all HIL devices: keyboard, 2 and 3 button mice [3], and ID module.
- Miscellaneous
  - Battery-backed real-time clock.
  - 98624 built-in HP-IB interface.
  - 98625A and 98625B 'fast' HP-IB interface.
  - 98658A built-in and add-on SCSI interface.
  - Printers and plotters on RS232 and HP-IB.
  - SCSI autochanger.

[1] 400-series machines configured for Domain/OS are not fully supported. Notably, the keyboard doesn't work and the ROMs must be in "HP-UX mode".

[2] SCSI-II drives are known to work, though this may require changing a jumper on some drives. See your disk's documentation for details.

[3] Serial mice connected to a 'HIL to quad' converter are also known to work.

If it's not on this list, there is no official support for it in this release.

### Getting the NetBSD System on to Useful Media

Installation is supported from several media types, including:

- FTP
- NFS
- Tape

The steps necessary to prepare the distribution sets for installation depend on which method of installation you choose. The various methods are explained below.

*FTP* It is possible, using the **install** and **upgrade** programs in the miniroot, to extract the binary sets directly onto disk from an FTP server. This is by far the easiest installation method, as you may specify to have all sets extracted at once, providing that they are located in the same directory on the server.

All that is required in this case is that you have network access to an FTP server. This may be your account on another system, or may even be ftp.netbsd.org itself. If you wish to use ftp.netbsd.org as your FTP file server, you may want to keep the following information handy:

```
IP Address: ftp.netbsd.org
Login: anonymous
Password: <your e-mail address>
Server path: /pub/NetBSD/NetBSD-1.5.3/hp300/binary/sets
```

*Note:* If you're not using a nameserver during installation, you might find 204.152.184.75 handy; it's the IP address of ftp.netbsd.org as of October, 2000.

*NFS* SYS_INST currently requires an NFS server from which to copy the miniroot.

- This file system must be exported with root permissions, but may be exported read-only.
- The miniroot image *must* reside in the 'root' of the mounted file system. For example, if the client system mounts `server:/u`, then the miniroot image must reside in `/u` on the server. This is due to limitations in the file lookup code used in SYS_INST, and may be fixed in a future release.
- If you also wish to install the binary sets from the NFS server, place them in a properly exported file system on the server. Note that these files do not suffer from the same placement restrictions as the miniroot.

*Tape* If you wish to load SYS_INST from tape, it must appear on the tape before any other files. To copy this onto tape, use a command like the following:

```
dd if=SYS_INST of=<tape_device> obs=20b conv=osync
```

Note that not all HP BOOTROMs support booting from SCSI tapes.

Copying the miniroot to disk from tape is not currently supported. However, it is planned for a future release.

If you wish to extract binary sets onto your disk from tape, you must first place them on the tape. The easiest way to do this is with the `dd`(1) command. Make sure you use a 'no-rewind-on-close' tape device. For example:

```
# for file in base.tgz etc.tgz; do
    dd if=${file} of=/dev/nrst0
```

```
# done
```

Note that depending on your tape drive, you may need to explicitly set the EOF marker at the end of each file. It may also be necessary to use the `conv=osync` argument to `dd`(1). Note that this argument is incompatible with the `bs=` argument. Consult the tape-related manual pages on the system where the tapes are created for more details.

**Preparing your System for NetBSD installation**

Currently, only installing the miniroot from the network is supported. This may change in a future release.

You will need information about your disk's geometry, based on 512-byte sectors. You must have this information before proceeding. The file `.../installation/misc/HP-IB.geometry` has geometry inforomation for several HP-IB disks, but may be incomplete. Geometry may be calculated from an HP-UX `/etc/disktab` entry, but note that HP-UX geometry is based on 1024 byte sectors, while NetBSD 's is based on 512 byte sectors.

*A quick note about partitions:* Since the target disk will become the boot disk for your new NetBSD/hp300 installation, you will need to treat the '`a`' and '`c`' partitions in a special manner. Due to the size of the NetBSD/hp300 boot program (it spills into the area after the disklabel), it is necessary to offset the '`a`' partition one cylinder from the beginning of the disk. Later, the '`c`' partition will be marked with the type `FS_BOOT` and may not be used for a file system. (For those unfamiliar with historic BSD partition conventions, the '`c`' partition is defined as the 'entire disk', or the 'raw partition'.)

*A quick note about disk numbers:* While in the SYS_INST program, you may use different unit numbers for the disks than when the NetBSD kernel is running. The unit number for a disk while in SYS_INST is calculated with the following formula:

```
unit = (controller * 8) + slave
```

Controllers are numbered 0, 1, ... starting with the lowest select code. SCSI controllers and HP-IB controllers are counted separately. Therefore, if you had a system with an internal HP-IB interface at select code 7, a fast HP-IB interface at select code 14, and a SCSI interface at select code 16, unit numers might be something like the following:

| **Location** | **Unit** | |
|---|---|---|
| HP-IB at 7, slave 2 | 2 | (disk: rd2) |
| HP-IB at 14, slave 5 | 13 | (disk: rd13) |
| SCSI at 16, slave 0 | 0 | (disk: sd0) |

*Miniroot installation via network*

*Note:* Booting sys_inst via the network on early hp300 models *is only possible if your bootrom is* rev. c *or later.* When checking the revision of your BOOTROM, use what it printed on the console during the self-test, not what may be printed on a sticker on the chip itself.

In order to complete this process, you will need the following from the `.../installation/misc` directory of the distribution:

`SYS_INST.gz` The standalone disklabel and miniroot installation tool. This file must be un-gzipped before using.

And you will need the following from the `.../installation/miniroot` directory of of the distribution:

`miniroot.fs.gz` A miniroot file system image.

To boot SYS_INST via the network, you will need a system capable of handling boot requests for an HP workstation. If you will use this method, see the special note below.

To boot SYS_INST from tape, you need only place SYS_INST on the tape as the first file.

*Loading SYS_INST via the network*

If you wish to load the SYS_INST program via the network, you may need the following from the `.../installation/misc` directory in addition to the items listed above:

`rbootd.tgz` Source code for the rbootd program included with NetBSD. It requires that the server has a Berkeley Packet Filter (bpf). You will need to compile this version of rbootd if your server system does not have this utility already.

First of all, configure your rbootd to handle boot requests from the client.

*Note:* NetBSD 's **rbootd** is slightly different from HP-UX's. To configure NetBSD 's **rbootd**, create a file called `/etc/rbootd.conf` and place in it an entry like the following:

```
08:00:09:04:AA:33 SYS_INST # thunder-egg
```

The first column is the ethernet address of the client's network interface. The second column is the program to send to the client, and anything after the '#' is a comment. Once you have rbootd running, copy the `SYS_INST` program to the `/usr/mdec/rbootd` directory on your server. If this directory doesn't exist already, you will need to create it.

For information on configuring rbootd under HP-UX, see the `rbootd`(1M) manual page on your server system.

Once **rbootd** is configured and running, you will be ready to continue.

Make sure that the miniroot file system image has been un-gzipped, and that it resides in a file system what is exported to the client. See the manual pages on your server system if you need more information about exporting file systems.

You are now ready to SYS_INST. During the client's self-test cycle, press SPACE a few times. Shortly, you should see a menu of possible boot options appear. Select the option corresponding to SYS_INST. SYS_INST will load and prompt you for a command.

If this is a new NetBSD installation, you will need to place a disklabel on the disk.

```
sys_inst> disklabel
```

*Note:* It may be worth selecting the **zap** option initially to ensure that the disklabel area is clear. This may be especially important if an HP-UX boot block had been previously installed on the disk.

Select the **edit** option, and answer the questions about your disk. There may be several questions which you may not be sure of the answers to. Listed below are guidelines for SCSI and HP-IB disks:

| | |
|---|---|
| Bad sectoring? | NO |
| Ecc? | NO |
| Interleave? | 1 |
| Trackskew? | 0 |
| Cylinderskew? | 0 |
| Headswitch? | 0 |
| Track-to-track? | 0 |
| Drivedata 0-4? | 0 (for all Drivedata values) |

Next, you will be asked to fill out the partition map. You must provide responses for all 8 partitions. Remember, you must allocate at least 6 MB for the '`b`' partition, or else the miniroot will not fit. Set the size and offset of any unused partition to 0. Note that sizes and offsets are expressed in 'n sectors', assuming 512 byte sectors. Care should be taken to ensure that partitions begin and end on cylinder boundaries (i.e. size and offset is an even multiple of the number of sectors per cylinder). While this is not technically necessary, it is generally encouraged.

*Note:* When setting the partition type of the 'b' partition, make sure to specify it as an `ffs` partition so that the miniroot can be mounted (even if this will be a swap partition). You will be given a chance to clean this up later in the installation process.

Once you have edited the label, select the **show** option to verify that it is correct. If so, select **write** and **done**. Otherwise, you may re-edit the label.

The next step is to copy the miniroot image onto the target disk.

```
sys_inst> miniroot
```

You will be prompted for the target disk and the source of the miniroot filesytem image.

Enter the filename of the miniroot image. Note that this file *must* reside in the server directory being mounted. Next you will be asked for the client's IP address, netmask, and default router, the server's IP address, and the directory on the server to mount. Once you have entered this information, SYS_INST will attempt to mount the NFS server and begin copying the miniroot file system to the 'b' partition of the target disk.

Is is worth noting that this copy may take a while. It might be worth grabbing a cup of coffee at this point.

Once the miniroot file system image has been copied onto the target disk, you may boot from the miniroot file system.

```
sys_inst> boot
```

Enter the disk from which to boot. The kernel in the miniroot file system will be booted into single-user mode.

## Installing the NetBSD System

The miniroot's install program is very simple to use. It will guide you through the entire process, and is well automated. Additional improvements are planned for future releases.

The miniroot's install program will:

1. Allow you to place disklabels on additional disks. Note that partition sizes and offsets are expressed in sectors. When you fill out the disklabel, you will need to specify partition types and file system parameters. If you're unsure what these values should be, use the following:

   ```
   fstype: 4.2BSD
   fsize: 1024
   bsize: 4096
   cpg: 16
   ```

   If the partition will be a swap partition, use the following:

   ```
   fstype: swap
   fsize: 0 (or blank)
   bsize: 0 (or blank)
   cpg: 0 (or blank)
   ```

   You will also need to specify the number of partitions. The number of partitions is determined by the 'index' of the last partition letter, where `a` = `1`, `b` = `2`, etc. Therefore, if the last filled partition is partition 'g', there are 7 partitions. Any partitions with size of 0 may be removed from the list.

   If the disk is the boot disk, you *must* offset the root partition ( / ) ('a' ) one cylinder, as the hp300 boot code if large enough to spill past the label area. In this case, the 'c' partition must be fstype `boot`.

Anything after a '#' is a comment.

The following is an example disklabel partition map:

```
7 partitions:
#      size   offset    fstype   [fsize bsize   cpg]
a:    30912      448    4.2BSD     1024  8192    16   # (Cyl.    1 - 69)
b:   130816    31360      swap                        # (Cyl.   70 - 361)
c:  1296512        0      boot                        # (Cyl.    0 - 2893)
e:    81984   162176    4.2BSD     1024  8192    16   # (Cyl.  362 - 544)
f:   102592   244160    4.2BSD     1024  4096    16   # (Cyl.  545 - 773)
g:   949760   346752    4.2BSD     1024  8192    16   # (Cyl.  774 - 2893)
```

2. Create file systems on target partitions.
3. Allow you to set up your system's network configuration. Remember to specify host names without the domain name appended to the end. For example use `foo` instead of `foo.bar.org`. If, during the process of configuring the network interfaces, you make a mistake, you will be able to re-configure that interface by simply selecting it for configuration again.
4. Mount target file systems. You will be given the opportunity to manually edit the resulting `/etc/fstab`.
5. Extract binary sets from the media of your choice.
6. Copy configuration information gathered during the installation process to your root file system ( `/` ) .
7. Make device nodes in your root file system under `/dev`.
8. Copy a new kernel onto your root partition ( `/` ) .
9. Install a new boot block.
10. Check your file systems for integrity.

First-time installation on a system through a method other than the installation program is possible, but strongly discouraged.

### Post installation steps

Once you've got the operating system running, there are a few things you need to do in order to bring the system into a properly configured state, with the most important ones described below.

1. Configuring `/etc/rc.conf`

   If you or the installation software haven't done any configuration of `/etc/rc.conf` (**sysinst** usually will), the system will drop you into single user mode on first reboot with the message

   ```
   /etc/rc.conf is not configured. Multiuser boot aborted.
   ```

   and with the root file system ( `/` ) mounted read-write. When the system asks you to choose a shell, simply press RETURN to get to a `/bin/sh` prompt. If you are asked for a terminal type, respond with **hp300h** for a local console, or whatever is appropriate for your serial console. and press RETURN. You may need to type one of the following commands to get your delete key to work properly, depending on your keyboard:

   ```
   # stty erase '^h'
   # stty erase '^?'
   ```

   At this point, you need to configure at least one file in the `/etc` directory. You will need to mount your root filesystem read/write with:

   ```
   # /sbin/mount -u -w /
   ```

Change to the `/etc` directory and take a look at the `/etc/rc.conf` file. Modify it to your tastes, making sure that you set `rc_configured=YES` so that your changes will be enabled and a multi-user boot can proceed. Default values for the various programs can be found in `/etc/defaults/rc.conf`, where some in-line documentation may be found. More complete documentation can be found in `rc.conf`(5).

If your `/usr` directory is on a separate partition and you do not know how to use **ed**, you will have to mount your `/usr` partition to gain access to **ex** or **vi**. Do the following:

```
# mount /usr
# export TERM=hp300h
```

If you have `/var` on a separate partition, you need to repeat that step for it. After that, you can edit `/etc/rc.conf` with `vi`(1). When you have finished, type **exit** at the prompt to leave the single-user shell and continue with the multi-user boot.

Other values that need to be set in `/etc/rc.conf` for a networked environment are *hostname* and possibly *defaultroute*, furthermore add an *ifconfig_int* for your <int> network interface, along the lines of

```
ifconfig_le0="inet 123.45.67.89 netmask 255.255.255.0"
```

or, if you have *myname.my.dom* in `/etc/hosts`:

```
ifconfig_le0="inet myname.my.dom netmask 255.255.255.0"
```

To enable proper hostname resolution, you will also want to add an `/etc/resolv.conf` file or (if you are feeling a little more adventurous) run `named`(8). See `resolv.conf`(5) or `named`(8) for more information.

Other files in `/etc` that may require modification or setting up include `/etc/mailer.conf`, `/etc/nsswitch.conf`, and `/etc/wscons.conf`.

2. Logging in

   After reboot, you can log in as `root` at the login prompt. Unless you've set a password in **sysinst**, there is no initial password. If you're using the machine in a networked environment, you should create an account for yourself (see below) and protect it and the "root" account with good passwords. Unless you have connected an unusual terminal device as the console you can just press RETURN when it prompts for `Terminal type? [...]`.

3. Adding accounts

   Use the `useradd`(8) command to add accounts to your system, *do not* edit `/etc/passwd` directly. See `useradd`(8) for more information on how to add a new user to the system.

4. The X Window System

   If you have installed the X Window System, look at the files in `/usr/X11R6/lib/X11/doc` for information.

   Don't forget to add `/usr/X11R6/bin` to your path in your shell's dot file so that you have access to the X binaries.

5. Installing third party packages

   If you wish to install any of the software freely available for UNIX-like systems you are strongly advised to first check the NetBSD package system. This automatically handles any changes necessary to make the software run on NetBSD, retrieval and installation of any other packages on which the software may depend, and simplifies installation (and deinstallation), both from source and precompiled binaries.

- More information on the package system is at
  **http://www.netbsd.org/Documentation/software/packages.html**
- A browsable listing of available packages is at
  **ftp://ftp.netbsd.org/pub/NetBSD/packages/pkgsrc/README.html**
- Precompiled binaries can be found at
  **ftp://ftp.netbsd.org/pub/NetBSD/packages**,
  usually in the `1.5.3/hp300/All` subdir. You can install them with the following commands:

  ```
  # export PKG_PATH=\
  ftp://ftp.netbsd.org/pub/NetBSD/packages/1.5.3/hp300/All\;\
  ftp://ftp.netbsd.org/pub/NetBSD/packages/1.5/hp300/All
  # pkg_add -v tcsh
  # pkg_add -v cvs
  # pkg_add -v apache
  # pkg_add -v perl
  ...
  ```

  The above commands will install the tcsh shell, the CVS source code management system, the Apache web server and the perl programming language as well as all the packages they depend on.
- Package sources for compiling packages on your own can be obtained by retrieving the file
  **ftp://ftp.netbsd.org/pub/NetBSD/NetBSD-current/tar_files/pkgsrc.tar.gz**
  They are typically extracted into `/usr/pkgsrc` (though other locations work fine), with the commands:

  ```
  # mkdir /usr/pkgsrc
  # ( cd /usr/pkgsrc ; tar -zxpf - ) < pkgsrc.tar.gz
  ```

  After extracting, then see the `README` file in the extraction directory (e.g. `/usr/pkgsrc/README`) for more information.

6. Misc

- Edit `/etc/mail/aliases` to forward root mail to the right place. Don't forget to run `newaliases`(1) afterwards.
- The `/etc/mail/sendmail.cf` file will almost definitely need to be adjusted; files aiding in this can be found in `/usr/share/sendmail`. See the README file there for more information.
- Edit `/etc/rc.local` to run any local daemons you use.
- Many of the `/etc` files are documented in section 5 of the manual; so just invoking

  ```
  # man 5 filename
  ```

  is likely to give you more information on these files.

### Upgrading a previously-installed NetBSD System

It is possible to easily upgrade your existing NetBSD/hp300 system using the upgrade program in the miniroot. If you wish to upgrade your system by this method, simply select the **upgrade** option once the miniroot has booted. The upgrade program with then guide you through the procedure. The upgrade program will:

1. Enable the network based on your system's current network configuration.
2. Mount your existing file systems.

3. Extract binary sets from the media of your choice.
4. Fixup your system's existing `/etc/fstab`, changing the occurrences of **ufs** to **ffs** and let you edit the resulting file.
5. Make new device nodes in your root file system under `/dev`.
6. Don't forget to extract the **kern** set from the distribution.

   *Note:* The existing kernel *will not* be backed up; doing so would be pointless, since older kernels may not be capable of running NetBSD 1.5.3executables.
7. Install a new boot block.
8. Check your file systems for integrity.

While using the miniroot's upgrade program is the preferred method of upgrading your system, it is possible to upgrade your system manually. To do this, follow the following procedure:

1. Place *at least* the **base** binary set in a file system accessible to the target machine. A local file system is preferred, since the NFS subsystem in the NetBSD 1.5.3 kernel may be incompatible with your old binaries.
2. Back up your pre-existing kernel and copy the 1.5.3 kernel into your root partition ( / ) .
3. Reboot with the 1.5.3 kernel into single-user mode.
4. Check all file systems:

   ```
   # /sbin/fsck -pf
   ```
5. Mount all local file systems:

   ```
   # /sbin/mount -a -t nonfs
   ```
6. If you keep `/usr` or `/usr/share` on an NFS server, you will want to mount those file systems as well. To do this, you will need to enable the network:

   ```
   # sh /etc/rc.d/network start
   ```
7. Make sure you are in the root file system ( / ) and extract the **base** binary set:

   ```
   # cd /
   # pax -zrvpe -f /path/to/base.tgz
   ```
8. Install a new boot block:

   ```
   # cd /usr/mdec
   # disklabel -B root-disk
   ```
   E.g.: *root-disk* could be `sd0`.
9. Sync the file systems:

   ```
   # sync
   ```
10. At this point you may extract any other binary sets you may have placed on local file systems, or you may wish to extract additional sets at a later time. To extract these sets, use the following commands:

    ```
    # cd /
    # pax -zrvpe -f path_to_set
    ```

*Note:* You *should not* extract the **etc** set if upgrading. Instead, you should extract that set into another area and carefully merge the changes by hand.

### Compatibility Issues With Previous NetBSD Releases

Users upgrading from previous versions of NetBSD may wish to bear the following problems and compatibility issues in mind when upgrading to NetBSD 1.5.3.

*General issues*

- `/etc/rc` modified to use `/etc/rc.d/*`

  Prior to NetBSD 1.5, `/etc/rc` was a traditional BSD style monolithic file; each discrete program or substem from `/etc/rc` and `/etc/netstart` has been moved into separate scripts in `/etc/rc.d/`.

  At system startup, `/etc/rc` uses `rcorder`(8) to build a dependency list of the files in `/etc/rc.d` and then executes each script in turn with an argument of 'start'. Many `rc.d` scripts won't start unless the appropriate `rc.conf`(5) entry in `/etc/rc.conf` is set to 'YES.'

  At system shutdown, `/etc/rc.shutdown` uses `rcorder`(8) to build a dependency list of the files in `/etc/rc.d` that have a "KEYWORD: shutdown" line, reverses the resulting list, and then executes each script in turn with an argument of 'stop'. The following scripts support a specific shutdown method: `cron`, `inetd`, `local`, and `xdm`.

  Local and third-party scripts may be installed into `/etc/rc.d` as necessary. Refer to the other scripts in that directory and `rc`(8) for more information on implementing `rc.d` scripts.

*Issues affecting an upgrade from NetBSD 1.4 or prior*

- `named`(8) leaks version information

  Previous releases of NetBSD disabled a feature of `named`(8) where the version number of the server could be determined by remote clients. This feature has not been disabled in NetBSD 1.5, because there is a `named.conf`(5) option to change the version string:

  ```
  option {
          version "newstring";
  };
  ```

- `sysctl`(8) pathname changed

  `sysctl`(8) is moved from `/usr/sbin/sysctl` to `/sbin/sysctl`. If you have hardcoded references to the full pathname ( in shell scripts, for example ) please be sure to update those.

- `sendmail`(8) configuration file pathname changed

  Due to `sendmail`(8) upgrade from 8.9.x to 8.10.x, `/etc/sendmail.cf` is moved to `/etc/mail/sendmail.cf`. Also, the default `sendmail.cf`(5) refers different pathnames than before. For example, `/etc/aliases` is now located at `/etc/mail/aliases`, `/etc/sendmail.cw` is now called `/etc/mail/local-host-names`, and so forth. If you have customized `sendmail.cf`(5) and friends, you will need to move the files to the new locations. See `/usr/share/sendmail/README` for more information.

### Using online NetBSD documentation

Documentation is available if you first install the manual distribution set. Traditionally, the "man pages" (documentation) are denoted by '`name(section)`'. Some examples of this are

- `intro`(1),
- `man`(1),

- `apropros`(1),
- `passwd`(1), and
- `passwd`(5).

The section numbers group the topics into several categories, but three are of primary interest: user commands are in section 1, file formats are in section 5, and administrative information is in section 8.

The *man* command is used to view the documentation on a topic, and is started by entering **`man`** [*`section`*] *`topic`*. The brackets [ ] around the section should not be entered, but rather indicate that the section is optional. If you don't ask for a particular section, the topic with the lowest numbered section name will be displayed. For instance, after logging in, enter

```
# man passwd
```

to read the documentation for `passwd`(1). To view the documentation for `passwd`(5), enter

```
# man 5 passwd
```

instead.

If you are unsure of what man page you are looking for, enter **`apropos`** *`subject-word`*

where *`subject-word`* is your topic of interest; a list of possibly related man pages will be displayed.

### Administrivia

If you've got something to say, do so! We'd like your input. There are various mailing lists available via the mailing list server at `majordomo@netbsd.org`. To get help on using the mailing list server, send mail to that address with an empty body, and it will reply with instructions.

There are various mailing lists set up to deal with comments and questions about this release. Please send comments to: `netbsd-comments@netbsd.org`.

To report bugs, use the `send-pr`(1) command shipped with NetBSD, and fill in as much information about the problem as you can. Good bug reports include lots of details. Additionally, bug reports can be sent by mail to: `netbsd-bugs@netbsd.org`.

Use of `send-pr`(1) is encouraged, however, because bugs reported with it are entered into the NetBSD bugs database, and thus can't slip through the cracks.

There are also port-specific mailing lists, to discuss aspects of each port of NetBSD. Use majordomo to find their addresses, or visit **http://www.netbsd.org/MailingLists/**. If you're interested in doing a serious amount of work on a specific port, you probably should contact the 'owner' of that port (listed below).

If you'd like to help with this effort, and have an idea as to how you could be useful, send us mail or subscribe to: `netbsd-help@netbsd.org`.

As a favor, please avoid mailing huge documents or files to these mailing lists. Instead, put the material you would have sent up for FTP or WWW somewhere, then mail the appropriate list about it, or, if you'd rather not do that, mail the list saying you'll send the data to those who want it.

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  Ralph Campbell
  Mike Karels
  Marshall Kirk McKusick

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- Redback Networks, Inc. for hosting the NetBSD mail and GNATS server.
- The Helsinki University of Technology in Finland for hosting the NetBSD CVS server.
- The Internet Research Institute in Japan for hosting the server which runs the CVSweb interface to the NetBSD source tree.
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  David Brownlee
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  Dave Burgess
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Eric and Rosemary Spahr
Ted Spradley
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Jason R. Thorpe
Steve Wadlow
Krister Walfridsson
Jim Wise
Reinoud Zandijk
Christos Zoulas

AboveNet Communications, Inc.
Advanced System Products, Inc.
Avalon Computer Systems
Bay Area Internet Solutions
Brains Corporation, Japan
Canada Connect Corporation
Co-operative Research Centre for Enterprise Distributed Systems Technology
Demon Internet, UK
Digital Equipment Corporation
Distributed Processing Technology
Easynet, UK
Free Hardware Foundation
Innovation Development Enterprises of America
Internet Software Consortium
MS Macro System GmbH, Germany
Numerical Aerospace Simulation Facility, NASA Ames Research Center

Piermont Information Systems Inc.
Precedence Technologies Ltd
Salient Systems Inc.
VMC Harald Frank, Germany
Warped Communications, Inc.
Whitecross Database Systems Ltd.

(If you're not on that list and should be, tell us! We probably were not able to get in touch with you, to verify that you wanted to be listed.)

- Finally, we thank all of the people who've put sweat and tears into developing NetBSD since its inception in January, 1993. (Obviously, there are a lot more people who deserve thanks here. If you're one of them, and would like to mentioned, tell us!)

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